Space Weather Forecast

Issued on Thursday, 27 July 2023 at 01:12 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: R1/R2 Minor/Moderate radio blackouts likely.

Analysis of Space Weather Activity over past 24 hours
Solar Activity: Moderate with three Moderate-class flares, the largest of which was from a region near the northwest limb at 26/1037 UTC. There are currently eleven sunspot regions on the visible disc, with one region no longer visible on the west limb, but a new region rotating onto the northeast limb. The region near the northwest limb has becoming increasingly active, but is very difficult to analyse due to the foreshortening effects near the limb. A region which recently rotated onto the disc in the northeast is showing more area and spots as it becomes more clearly visible. Other regions appear to be stable at the present time.
No Earth-directed Coronal Mass Ejections (CMEs) were observed in the last 24 hours.

Solar Wind / Geomagnetic Activity: The solar wind showed waning CME effects after a CME arrival at 25/2153 UTC, perhaps with some coronal hole fast wind influence. Wind speeds varied mainly between 450-550 km/s, but jumped after 26/1600UTC to be between 520-580 km/s. The Interplanetary Magnetic Field was initially moderate, but slowly became weak. The north-south component was mostly southward directed, varying moderately at first then gradually varying weakly during the period. Geomagnetic activity was Quiet to Active (Kp 2-4).

Energetic Particles / Solar Radiation: The observed count rate of high energy particles (high energy protons) was just very slightly elevated at first after a far sided flare, but gradually eased to background levels. No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary
Solar Activity: Low to Moderate activity is expected, with a slight chance of Strong flares, most likely from the most active region near the northwest limb.

Solar Wind / Geomagnetic Activity: A CME reached Earth late on 25 July, which is now considered likely to have been the early arrival of a CME which left the Sun on 23 July. There are no further CME arrivals expected at the current time. A coronal hole fast wind may have already connected with Earth, although the ongoing weak CME effects are somewhat masking this signal. Wind speeds are likely to be elevated through the first couple of days of this period, with a slow decline expected thereafter.
Geomagnetic activity is expected to be mostly Quiet to Unsettled, perhaps with some Active intervals on Days 1 and 2 (27-28 July) due to a combination of waning CME effects and a weak coronal hole fast wind.

Energetic Particles / Solar Radiation: There remains a slight chance of the observed count rate of energetic particles increasing from any significant flares that occur. This risk reduces a little through the period as the active region near the northwest limb rotates away.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	5	1	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	60	60	50	50
Very Active	R3 to R5 X	No	10	10	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	10	5	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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